Master thesis

Viscou-thermal acoustics on moving domains

Motivation:

Due to the requirements of headphones to get more compact and efficient, the demand for highly integrated Micro-Electro-Mechanical Systems (MEMS) speaker solutions is on the rise. The high integration and small scales (sub micro-meter range) poses the requirement to include viscous and possibly thermal effects for the sound propagation. Furthermore, the sound generation principles investigated at our institute require a formulation for moving domains in order to resolve e.g. the shutter movement. Therefore, the already existing Arbitrary-Lagrangian-Eulerian (ALE)-framwork for viscous acoustics of our inhouse FEM solver *openCFS* should be extended to also include thermal effects. The goal of this thesis is to derive the formulation, implement and test it in *openCFS.*

Tasks:

- Derive and verify an ALE formulation for thermo-viscous acoustics
- Implement the missing coupling and ALE-related terms in *openCFS* (programming language is C++)
- Test the formulation

Organization:

- Start at any time

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